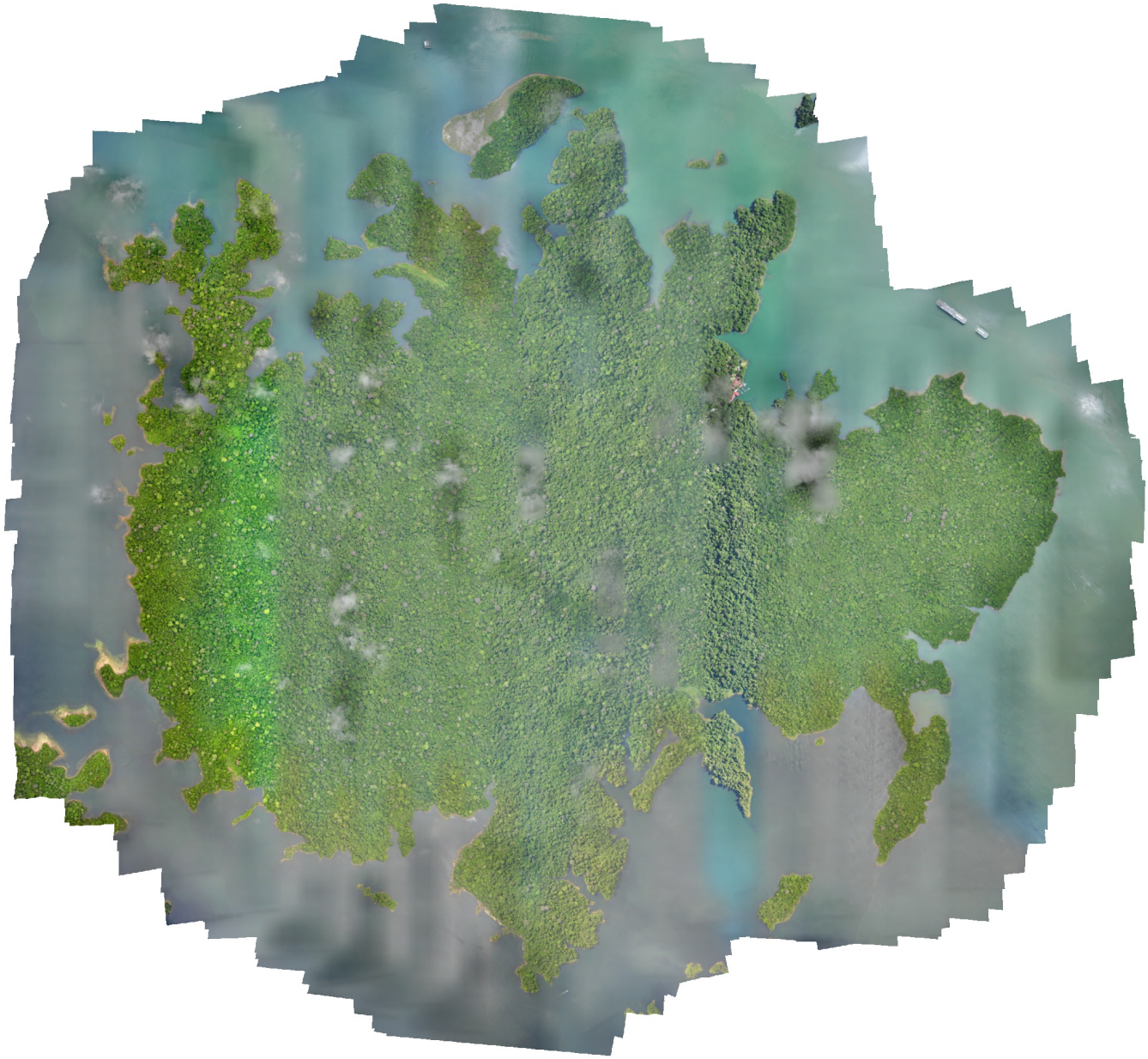
# BCI-Completa- 2018

**Processing Report**

**25 June 2018**



# Survey Data

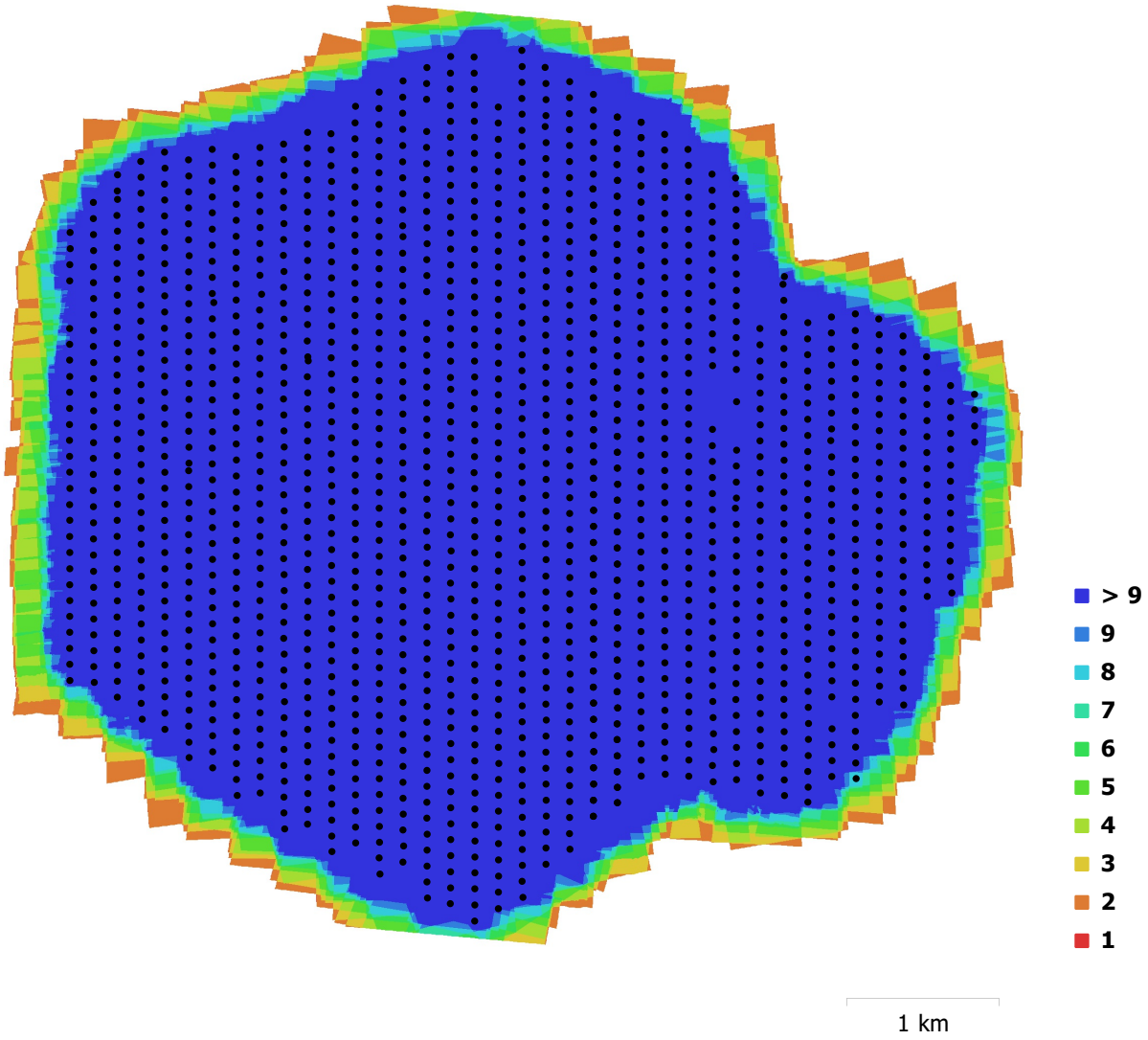



Fig. 1. Camera locations and image overlap.

| | | | |
|---|---|---|---|
| Number of images: | 1,617 | Camera stations: | 1,590 |
| Flying altitude: | 659 m | Tie points: | 1,572,805 |
| Ground resolution: | 14 cm/pix | Projections: | 4,661,858 |
| Coverage area: | 31 km² | Reprojection error: | 1.08 pix |

| Camera Model | Resolution | Focal Length | Pixel Size | Precalibrated |
|---|---|---|---|---|
| S.O.D.A. (10.6 mm) | 5472 x 3648 | 10.6 mm | 2.4 x 2.4 µm | No |

Table 1. Cameras.

# Camera Calibration

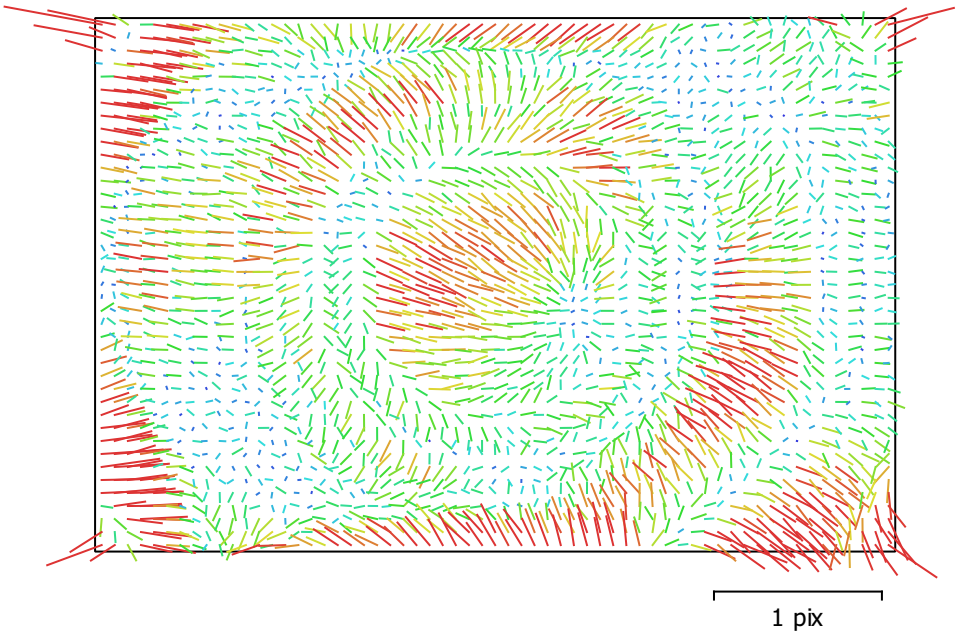



Fig. 2. Image residuals for S.O.D.A. (10.6 mm).

**S.O.D.A. (10.6 mm)**

1617 images

| Type | Resolution | Focal Length | Pixel Size |
|---|---|---|---|
| **Frame** | **5472 x 3648** | **10.6 mm** | **2.4 x 2.4 µm** |

| | Value | Error | F | Cx | Cy | B1 | B2 | K1 | K2 | K3 | K4 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **F** | **4401.8** | 0.15 | 1.00 | 0.17 | -0.82 | 0.17 | 0.07 | 0.03 | -0.04 | 0.06 | -0.03 | -0.01 | -0.14 |
| **Cx** | **-20.1009** | 0.035 | | 1.00 | -0.14 | 0.04 | 0.07 | 0.03 | -0.02 | 0.02 | -0.01 | 0.55 | -0.04 |
| **Cy** | **5.92291** | 0.055 | | | 1.00 | -0.19 | -0.07 | -0.09 | 0.08 | -0.09 | 0.06 | 0.00 | 0.33 |
| **B1** | **0.834545** | 0.016 | | | | 1.00 | -0.01 | 0.03 | -0.05 | 0.05 | -0.04 | -0.01 | -0.01 |
| **B2** | **-0.120864** | 0.017 | | | | | 1.00 | 0.00 | -0.01 | 0.01 | -0.00 | 0.09 | -0.01 |
| **K1** | **0.0447454** | 5.8e-05 | | | | | | 1.00 | -0.96 | 0.92 | -0.86 | 0.03 | -0.11 |
| **K2** | **-0.318079** | 0.0004 | | | | | | | 1.00 | -0.99 | 0.96 | -0.01 | 0.00 |
| **K3** | **0.649603** | 0.0011 | | | | | | | | 1.00 | -0.99 | 0.01 | 0.00 |
| **K4** | **-0.347684** | 0.0011 | | | | | | | | | 1.00 | -0.00 | -0.01 |
| **P1** | **-0.00223067** | 1.7e-06 | | | | | | | | | | 1.00 | -0.07 |
| **P2** | **0.000555931** | 2.1e-06 | | | | | | | | | | | 1.00 |

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

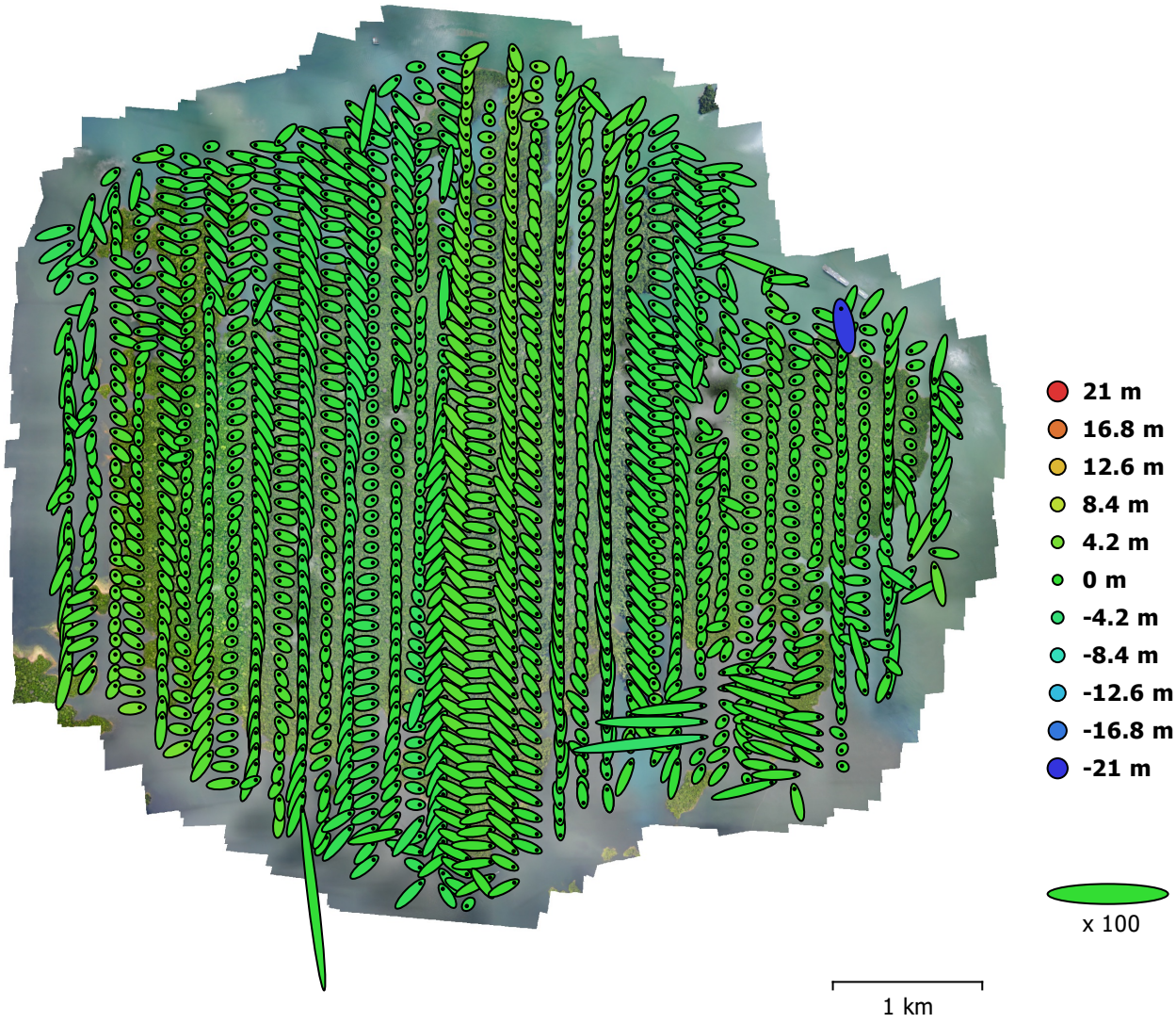



Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

| X error (m) | Y error (m) | Z error (m) | XY error (m) | Total error (m) |
|---|---|---|---|---|
| 0.918273 | 1.20571 | 1.42707 | 1.51558 | 2.08171 |

Table 3. Average camera location error.
X - Longitude, Y - Latitude, Z - Altitude.

# Digital Elevation Model

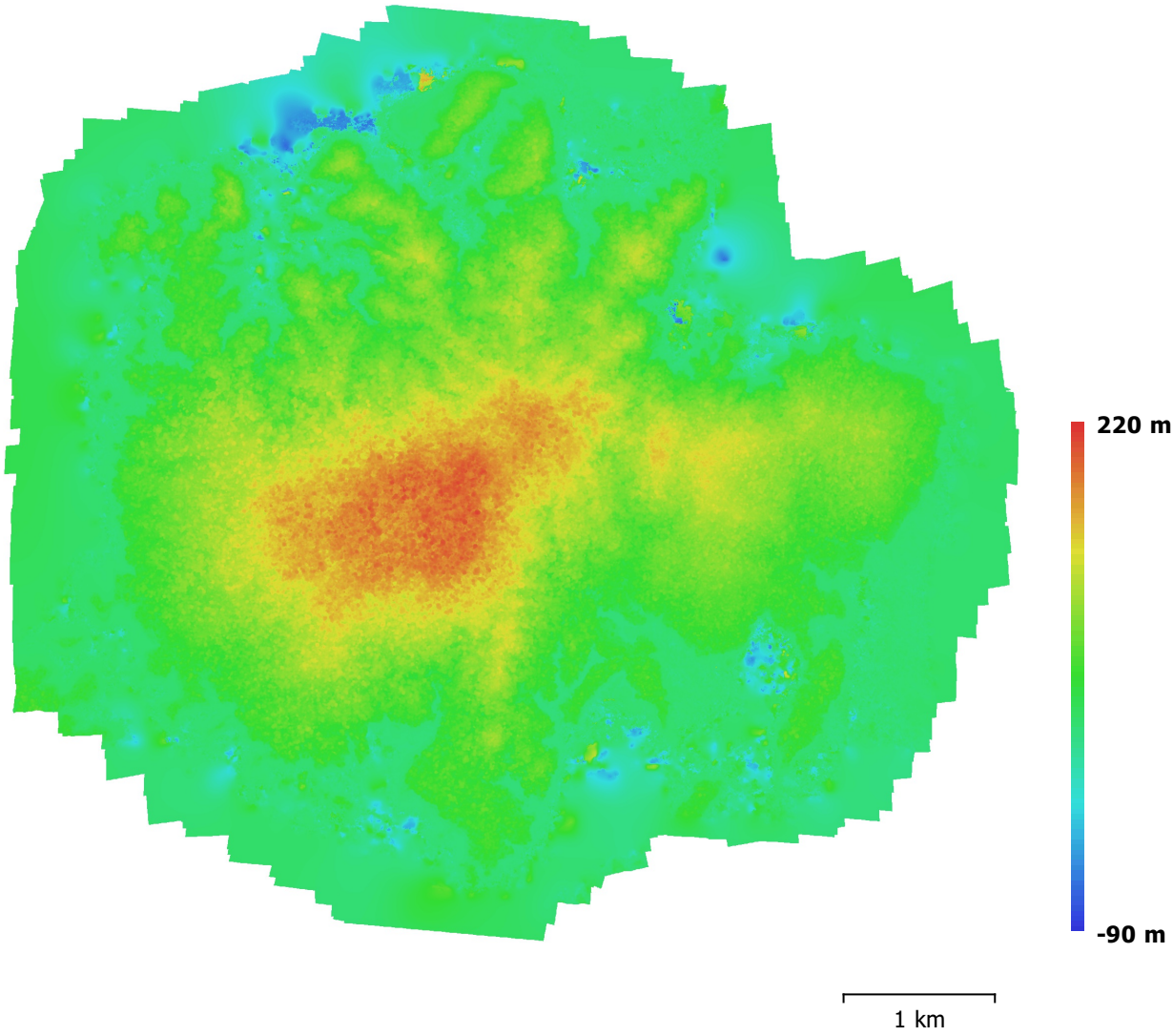



Fig. 4. Reconstructed digital elevation model.

| | |
|---|---|
| Resolution: | 55.8 cm/pix |
| Point density: | 3.21 points/m² |

# Processing Parameters

| | |
|---|---|
| **General** | |
| Cameras | 1617 |
| Aligned cameras | 1590 |
| **Shapes** | |
| Polygons | 1 |
| Coordinate system | WGS 84 + EGM96 height |
| Coordinate system | WGS 84 (EPSG::4326) |
| Rotation angles | Yaw, Pitch, Roll |
| **Point Cloud** | |
| Points | 1,572,805 of 1,805,053 |
| RMS reprojection error | 0.118501 (1.08016 pix) |
| Max reprojection error | 0.358064 (53.4784 pix) |
| Mean key point size | 7.51919 pix |
| Effective overlap | 3.07772 |
| **Alignment parameters** | |
| Accuracy | Medium |
| Generic preselection | No |
| Reference preselection | Yes |
| Key point limit | 40,000 |
| Tie point limit | 4,000 |
| Adaptive camera model fitting | Yes |
| Matching time | 1 hours 20 minutes |
| Alignment time | 16 minutes 42 seconds |
| **Dense Point Cloud** | |
| Points | 119,901,365 |
| **Reconstruction parameters** | |
| Quality | Medium |
| Depth filtering | Aggressive |
| Depth maps generation time | 2 hours 48 minutes |
| Dense cloud generation time | 2 hours 20 minutes |
| **DEM** | |
| Size | 14,499 x 12,008 |
| Coordinate system | WGS 84 / UTM zone 17N (EPSG::32617) |
| **Reconstruction parameters** | |
| Source data | Dense cloud |
| Interpolation | Enabled |
| Processing time | 5 minutes 6 seconds |
| **Orthomosaic** | |
| Size | 48,044 x 44,268 |
| Coordinate system | WGS 84 / UTM zone 17N (EPSG::32617) |
| Channels | 3, uint8 |
| **Reconstruction parameters** | |
| Blending mode | Mosaic |
| Surface | DEM |
| Enable color correction | No |
| Enable hole filling | Yes |
| Processing time | 44 minutes 47 seconds |
| **Software** | |
| Version | 1.3.4 build 5067 |
| Platform | Windows 64 |